Early Thinking on ARDA in the Applications Area

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So far…

- ARDA AA Meeting Nov 27
  - Small first meeting with the AA LCG people we expect to be involved with a substantial amount of their time
    - Derek Feichtinger, Juha Herrala, Kuba Moscicki, Frederick Orellana
    - Plus Frederic Hemmer, Predrag Buncic, Dirk Duellmann, Alberto Aimar and myself
  - Had an overview of ARDA from Predrag, then discussed possible areas of AA activity
- Frederic's initial ARDA middleware meeting
  - TW attended (some of it) as AA rep

- The following is based mainly on Nov 27 meeting notes + feedback

General ARDA AA Objectives

- Common software above the middleware layer
  - Adapting, extending, interfacing AA software for ARDA
  - Participating in ARDA interface definition; ensuring AA requirements met
    - ARDA interfaces insulate users from underlying technology while allowing to immediately leverage existing implementations
  - Applying lower level middleware services to provide specialized higher level services directed at HEP and analysis
- Integration and validation
  - Integrating ARDA middleware services and analysis application level services into end-to-end distributed analysis prototype
  - Assisting integration of distributed analysis prototype or components thereof into experiment environments
  - Validation of the prototype and feedback to middleware providers

General work areas

1) Event data management and access
2) Framework integration services
3) Provenance and session state information management
4) Interactive analysis tools
5) Analysis environment integration and validation

… and including first thoughts on work package organization

Event data management and access

- Event collections, physics-level datasets, physics queries
- Efficient sparse data access
- Data access below file level (event objects)
- Splitting at physics dataset level
- A mix of interface development, POOL work, ROOT work

- Collections work currently going on in a POOL WP, but this work needs an ‘analysis’ perspective and not just a ‘persistency’ perspective – ARDA can provide that
  - Make this ARDA work package a joint work package with POOL Collection WP

Framework integration services

- Interfacing/integrating framework-level distributed services
  - Distributed messaging, error handling, logging, …
- Interactive interface; Python, ROOT bindings
- Framework access to more sophisticated middleware services?
  - Workflow management, replication, …
- Probably mostly a very ‘thin’ activity
  - not developing services, or even probably the interfaces
    - the middleware people will do this, though this WP will probably contribute to interface definition
  - just packaging/integrating them for the AA architecture
  - Maybe some specialization of generic services (such as next area…)

- The long-empty ‘grid based services’ box in SEAL
  - Joint ARDA/SEAL WP

Provenance and session state info management

- Higher level provenance info services as an application of the generic provenance service provided by middleware
  - HEP specificity
  - Presentation of provenance info to the user
  - Unless everything above the generic service level is regarded as experiment specific
- Persistent analysis session support
  - Again adding ARDA analysis environment specificity above generic services, if all is not experiment specific
  - Customization of analysis environment
    - Support for non-standard algorithms, configurations
- Fold into 'framework integration services' WP

Interactive Analysis Tools

- Interfacing to tools supporting interactive (low-latency, rapid-response) analysis
- ROOT, PROOF integration
- Interfacing to tools supporting ‘chaotic’ workload management
  - User level management/monitoring
  - User level reservations (‘what’ and ‘when’)
- Interfacing to tools supporting dynamic job interaction/control
- AIDA integration

- Needs will vary from experiment to experiment; maybe mostly experiment-specific integration
- Fold into the next WP…

Analysis Environment Integration & Validation

- ARDA integration as an analysis system in experiment environments
  - Integrating experiment specific front end with ARDA back end
- Early priority: users in experiments testing detailed use cases using experiment-integrated ARDA
  - Get ARDA in the hands of (select) physicists doing analysis as soon as possible (as soon as there is a tool of interest to attract them – experiment ARDA teams need to sell the product)
- The key work package
  - Support four distinct but collaborative ARDA integration efforts in the experiments
  - Coordinate gathering of feedback from experiment ARDA teams/users
  - Provide overall coordination/coherence for AA ARDA
- No ‘joint WP’ arrangement with existing AA project

Summarizing My Current Thoughts on WPs

1) Integration and Validation
   - Main driver for ARDA in AA
   - Primarily providing coordination, communication, coherence for integration efforts residing in the experiments
     - And ensuring close communication/feedback to middleware part of the project
     - Some similarity to Physics Validation in the simu project
2) Event data management
   - Physics-driven event collections
   - Incorporating POOL Collections WP
3) Framework integration
   - 'Thin' adaptation of middleware services to whatever is required for integration in experiment analysis frameworks
   - Joint WP with SEAL

Next Steps

- Take account of your feedback and pass this to Frederic to use as he pleases in the SC2
- Take account of SC2 feedback, circulate to apps area, discuss in AF
- Take account of general feedback, flesh it out, and use as a starting point for workshop discussion
- As WPs firm up, sort out WP leaders

- Last but not least
  - Still have four people wanting to start work!
  - Need to find constructive non-controversial interesting tasks ASAP